An Investigation Into the Thermodynamics of Solid   SOV/76-33-2-17/45
Solutions of Gold, Silver, and Copper I

(Ref 11) and in the present paper are in good agreement.
The values given by Downing, Edwards and Heriek (Douning,
Edwards)(Ref 12) are too high and those by Harteck are too
low. The most reliable data for liquid Cu are those given by
Hersh. There are 4 figures, 3 tables, and 12 references,
2 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
                (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 9, 1957

Card 3/3

5(4), 18(6)   SOV/76-33-3-15/41
AUTHORS: Nesmeyanov, An. N., Smakhtin, L. A., Lebedev, V. I.

TITLE: Investigation of the Thermodynamics of Solid Solutions of
              Cold With Silver and Copper.II (Issledovaniye po termodina-
              mike tverdykh rastvorov zolota s serebrom i med'yu. II)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 3,
              pp 599 - 606 (USSR)

ABSTRACT: In a previous paper (Ref 1) investigations were carried out
              on the pressure of saturated vapors of solid Au, Ag, and Cu
              by means of radioactive isotopes Au^{198}, Ag^{110}, and Cu^{64}
              according to the Knudsen method. In the present paper ex-
              perimental results are described concerning the partial
              pressures of gold, silver and copper in solid solutions. The
              experimental data (Tables 1,2) were worked out according to
              the method of the least squares and represented as straight
              lines $\lg P_i = A + B/T$. The activities in the case of 1250
              and $1111°K$ were calculated from the equations for the pressure
Card 1/3   of the saturated vapors of the pure metals and the partial

Investigation of the Thermodynamics of Solid Solutions   SOV/76-33-3-15/41
of Gold With Silver and Copper.II

pressures in the case of Au, Ag, and Cu in the alloys
Au-Ag and Au-Cu. By means of the experimentally obtained
values of the activity coefficients (Tables 1,2) and the
equation according to Gibbs-Duhem both activity coefficients
in the concentration range of from $0.2\ N_i$ to $0.8\ N_i$ were

calculated according to the method of successive approxima-
tions at graphic integration. Equations on the relation bet-
ween the activities of the components of the alloys and the
temperature in form of linear functions lg a_i - $1/T$ were

calculated from the values of the activity coefficients for
the two above-mentioned temperatures (Tables 3,4); herefrom
several thermodynamic partial and integral functions of
solid solutions (Tables 5,6) were derived. The majority of
the results obtained is in good agreement with the publication
data. On comparing the experimental results obtained with the
approximations of the theory of solid solutions only a quali-
tative agreement was to be observed which means a limited
applicability of these approximations. The observed excess
entropy of mixing is considered to be due to the Variation

Card 2/3

Investigation of the Thermodynamics of Solid Solutions   SOV/76-33-3-15/41
of Gold With Silver and Copper.II

of the oscillation frequency of the atoms in the crystal
lattice on the transition metal → alloy. There are 4 figures,
8 tables, and 16 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 9, 1957

Card 3/3

LEBEDEV, V.I.

Constitution of minerals. Zap. Vaes. min. ob-va 92 no. 3:369-373 '63.   (MIRA 17:9)

L 62554-65   EWT(1)

ACCESSION NR: AT5016482

UR/2649/65/000/189/0071/0075

AUTHOR: Pokrovskiy, S. M.; Lebedev, V. I.

TITLE: Use of a directional radiometer for experimental determination of the effective degree of blackness of a jet

SOURCE: Moscow. Institut inzhenerov zheleznodorozhnogo transporta. Trudy, no. 189, 1965. Issledovaniye teploobmena v teploenergeticheskikh ustanovkakh i v ustanovkakh dlya polucheniya poluprovodnikovykh materialov (Investigation of heat exchange in thermal power units and in equipment for producing semiconductor materials), 71-75

TOPIC TAGS: thermodynamic analysis, black body radiation, thermal radiation

ABSTRACT: This article presents results of experimental determination of the degree of blackness of a jet during combustion of a liquid fuel (kerosene) and of a gas (propane in the pure form and mixed with chrome-magnesite dust) and these results are compared with calculated data. The radiation flux was measured by a directional radiometer placed in a window in the wall of a furnace. Radiation from the jet fell upon the element of the radiometer. Before the experiment, the radiometer was

Card 1/2

L 62554-65

ACCESSION NR: AT5016482

calibrated by rays from an ideal black body. The results are tabulated. Orig. art.
has: 3 formulas, 2 tables.

ASSOCIATION: Institut inzhenerov zheleznodorozhnogo transporta, Moscow (Institute
of Railroad Transportation Engineers)

SUBMITTED: 00   ENCL: 00   SUB CODE: OP, NP

NO REF SOV: 003   OTHER: 000

Card 2/2

LEBEDEV, V.I.

SUBJECT	USSR/MATHEMATICS/Differential equations CARD 1/1 PG - 21
AUTHOR	LEBEDEV V.I.
TITLE	Equations and convergence of the differential-difference-method (method of straight lines).
PERIODICAL	Vestnik Moskovsk.Univ. 10, No. 1, (Ser.Fiz.mat.estestv.Nauk No.7) 47-57 (1955) reviewed 5/1956

The author establishes approximative equations and considers the convergences for the case that for the approximative solution of linear partial differential equations the differential quotients are replaced by difference quotients. The author treats cases as

$$\partial^2 u/\partial x^2 + \partial^2 u/\partial y^2 = f(x,y)$$

and

$$\partial^2 u/\partial \varsigma^2 + (1/\varsigma)(\partial u/\partial \varsigma) + (1/\varsigma^2)(\partial^2 u/\partial \varphi^2) = f(\varsigma, \varphi)$$

with given boundary values and other examples.

Lebedev, V. I.

Lebedev, V. I. On a system of parabolic equations,
Dokl. Akad. Nauk SSSR (N.S.) 103 (1955), 763-766.

Russian.

1-FW

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LEBEDEV, V. I., Cand Phys-Math Sci -- (diss) "Method of Nets

for a Single System of Equations and Partial Derivatives."

Mos, [Publication of Acad Sci USSR], 1957. 7 pp (Mos Order of

Lenin and Order of Labor Red Banner State Univ im M. V. Lomonosov,

Mechanomathematical Faculty), 120 copies (KL, 49-57, 110)

- 3 -

20-6-5/59

AUTHOR   LEBEDEV, V.I.,
TITLE   The Method of the Orthogonal Projections for the Analogy (With Finite Differences) of a System of Equations.
          (Metod ortogonal'nykh proyektsiy dlya konechnoraznostnogo analo-
          ga odnoy sistemy uravneniy -Russian)

PERIODICAL   Doklady Akademii Nauk SSSR,1957,Vol 113,Nr 6,pp 1206-1209(U.S.S.R.)
          Received 7/1957   Reviewed 8/1957

ABSTRACT   The present paper investigates the properties of the solutions of
          the analogy (with finite differences) of the system of equations
          $\partial \vec{U}/\partial t = AU - \nabla p + \vec{F}$, div $\vec{U}=0$. Here A denotes a matrix with limited ele-
          ments and $\vec{U} = (u_1(x_1,x_2,x_3,t),u_2(x_1,x_2,x_3,t),u_3(x_1,x_2,x_3,t))$;
          $F=(f_1,f_2,f_3)$ applies. For just this system of equations either
          the CAUCHY problem is set up(in this case $\vec{U}|_{t=0}=\vec{U}_0(x_1,x_2,x_3)$ is
          assumed) or a mixed problem is investigated. The solution of the
          above equation problem is sought in the simply connected domain Ω.
          Ω here satisfies the condition $\vec{U}|_{t=0}=\vec{U}(x_1,x_2,x_3)$ as well as one
          of the following two conditions:
          Either $p|_s=0$ or $\sum_{i=1}^{3} u_i \cos(n,x_i)|_s = \vec{U}_n|_S = 0$. Here S denotes the

          boundary of the domain Ω and n - the vertical on the boundary;the
          author gives some lemmata and theorems and outlines their proofs
          in form of a drawing. Because of the many denotations contain-
          ed therein, the theorems cannot be given here. From the form of

Card 1/2

20-114-6-8/54

AUTHOR: Lebedev, V. I.

TITLE: The Use of Nets for the Sobolev-Type of Equation (Metod setok dlya uravneniy tipa S. L. Soboleva)

PERIODICAL: Doklady Akademii Nauk SSSR,1957,Vol.114,Nr 6,pp.1166-1169(USSR)

ABSTRACT: It is assumed that the function $u(x,t)$ is within the range $Q = \Omega \times [\Omega; \ell]$ a solution of the equation

$$Lu \equiv \frac{\partial^2}{\partial t^2} L_0 u + \frac{\partial}{\partial t} L_1 u + L_2 u = f(x,t).$$

Four secondary conditions for u are given. The author here confines himself to the case where the coefficients of the above-given equation are only dependent on x and where they are limited. Besides, they must satisfy a condition given here. The existence and the uniquness of the generalized solution of this problem were already proved by M. I. Vishik (Refs 1, 2). Therefore the author here treats the convergence of the solutions of the finite difference analogon of the above-mentioned equation and the differential properties of the generalized solution in a closed domain. First the gene-

Card 1/2

20-114-6-8/54

The Use of Nets for the Sobolev-Type of Equation

ralized solution $\underline{u}$ of the problem raised here is defined and then the finite difference analogon of the above-mentioned equation is defined. Finally other difference relations are estimated. By a theorem are given the differential properties of solutions of the system

$$(\partial \bar{u}/\partial t) = A\bar{u} - \text{grad } p + \bar{F}, \qquad \text{div } \bar{U} = 0$$

There are 4 references, 4 of which are Slavic.

ASSOCIATION: Moscow State University imeni M. V. Lomonosov
(Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova)

PRESENTED: January 16, 1957, by S. L. Sobolev, Member of the Academy

SUBMITTED: January 11, 1957

Card 2/2

V.I. Lebedev

SOV/55-58-2-33/35

16(1)
AUTHORS: Skoryy, I.A., University Lecturer, and
             Kopylov, V.D., Scientific Assistant

TITLE: Lomonosov - Lectures 1957 at the Mechanical-Mathematical
             Faculty of Moscow State University (Lomonosovskiye
             chteniya 1957 goda na mekhaniko-matematicheskom
             fakul'tete MGU)

PERIODICAL: Vestnik Moskovskogo Universiteta. Seriya matematiki, mekhaniki,
             astronomii, fiziki, khimii, 1958, Nr 4, pp 241-246 (USSR)

ABSTRACT: The Lomonosov lectures 1957 took place from October 17 -
             October 31, 1957 and were dedicated the 40-th anniversary
             of the October revolution.

16. A.D. Gorbunov, Lecturer and B.M. Budak, Lecturer :
    Difference Methods for the Solution of Hyperbolic
    Equations.

17. N.S. Bakhvalov, Aspirant : Difference Method for the
    the Solution of Elliptic Equations. Number of Calculation Operations for
    the Solution of Elliptic Equations.

18. V.I. Lebedev, Aspirant : Sobolev-System.

19. Professor Ye.B. Dynkin, Candidate of Physical-Mathematical
    Sciences : Markov Processes and Semigroups.

20. A.G. Kostyuchenko : Decomposition of Differential
    Operators With Respect to Generalized Eigenfunctions.

21. F.A. Berezin, Candidate of Physical-Mathematical Sciences :
    Science : Generalized of Physical-Mathematical Sciences on Mani-
    folds.

22. V.M. Borok, Aspirant : General Properties of Partial
    Foundations of the Theory of Spherical Harmonics on Mani-

23. V.A. Ilyin, Lecturer : Reversal of Terms in Trigono-
    V.A. Ilyanskiy, Candidate of Physical-Mathematical Analysis.
    Evolution Systems. Candidate of Physical-Mathematical
    Sciences : On the Number of Boundary Cycles
    metric Series.

24. P.L. Ul'yanov, Lecturer : Reversal of Terms in Trigono-

25. I.G. Petrovskiy, Academician and Ye.M. Landis, Senior
    Scientific Assistant : On the Number of Boundary Cycles
    of a Linear Differential Equation of First Order With a Rational
    Right Side.

    The contents of all the lectures have already been published.

Card 5/5

AUTHOR: Lebedev, V.I.   SOV/38-22-5-8/10

TITLE: On the Method of Nets for a System of Partial Differential
             Equations (O metode setok dlya odnoy sistemy uravneniy v
             chastnykh proizvodnykh)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya matematicheskaya, 1958,
             Vol 22, Nr 5, pp 717-734 (USSR)

ABSTRACT: The paper contains a detailed representation of the results
             announced in [Ref 4,5,10]. For a system of partial differential
             equations different from that of Sofiya Kovalevskaya, the mixed
             problem and the Cauchy problem are established. For functions
             given on a lattice, the decomposition into two orthogonal sub-
             spaces is proved. With the aid of difference methods the
             existence of the solution is proved and its properties are
             investigated. In the closed domain the author considers
             differential properties of the solutions of equations of the
             type of Sobolev.
             There are 10 Soviet references.

PRESENTED: by S.L.Sobolev, Academician
SUBMITTED: January 7, 1957

Card 1/1

16(1)

AUTHOR: Lebedev, V. I.

TITLE: The Finite Difference Analogue of Neuman's Problem

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 126, Nr 3, pp 494-497 (USSR)

ABSTRACT: A function $u(x_1, x_2, \ldots, x_n)$ is sought which in the domain $\Omega(x_1, x_2, \ldots, x_n)$ of the n-dimensional space $R_n(x_1, x_2, \ldots, x_n)$ is a solution of

(1) $\Delta u = f$, $\left.\dfrac{\partial u}{\partial n}\right|_S = \varphi$;

S is the boundary of Ω. Let $f \in L_2(\Omega)$, $\varphi \in L_2(S)$, Ω is star-shaped, $\int_\Omega f \, d\Omega = \int_S \varphi \, dS$. Let there exist a generalized solution and let $\int_\Omega u \, d\Omega = 0$. Let the space R_n be decomposed into the cubes $\Omega_{k_1 k_2 \ldots k_n}$ by the planes $x_i = k_i h$, $i = 1, 2, \ldots, n$. The points with the coordinates $(k_1 h, k_2 h, \ldots, k_n h)$ are the nodes. Let Ω_h be the

Card 1/3

The Finite Difference Analogue of Neuman's Problem   SOV/20-126-3-9/69

domain consisting of the $\Omega_{k_1 k_2 \ldots k_n}$ belonging to Ω. Let S_h be the boundary of Ω_h. Let $ux_i(x_i + \frac{h}{2}) = h^{-1}(u(x_i + h) - u(x_i))$. In all inner nodes (1) is replaced by (2) $\Delta_h u = f_h$ in the usual manner, where f_h is an approximation of f. On S_h an analogue of the derivative with respect to the normal is defined: let $x_o \in S_h$ be a node and in the distance h of x_o there lie k inner nodes $x_j, j = 1, 2, \ldots, k$. Then

$$(3) \qquad l_h(u) = h^{-1}\left(ku(x_o) - \sum_{j=1}^{k} u(x_j)\right) = \varphi_h \; ;$$

let φ_h be given on S_h.

Theorem: For the solvability of the system (2)-(3) it is necessary and sufficient that

$$h^n \sum_{\Omega_h} f_n = h^{n-1} \sum_{S_h} \varphi_n \; .$$

Card 2/3

The Finite Difference Analogue of Neuman's Problem   307/20-126-3-9/69

Then two cases are investigated in detail.

1) $\frac{\partial u}{\partial n}\big|_S = 0$. For f_h an approximation is taken so that $h^n \sum\limits_{\Omega_h} f_h = 0$;

putting $l_h(u) = 0$ on S_h, then it shall hold $h^n \sum\limits_{\Omega_h} u = 0$. Then in

every strongly inner domain Ω' of Ω for $h \to 0$ the sequence u_h

converges weakly to the generalized solution u.
2) $f = 0$. For $n = 2$ and $n = 3$ very difficult arrangements about
the choice of φ_h on S_h are made.

There are 10 references, 7 of which are Soviet, 2 German, and
1 Indian.

PRESENTED: February 16, 1959, by S.L.Sobolev, Academician

SUBMITTED: November 24, 1958

Card 3/3

16(1)

AUTHOR: Lebedev, V.I.   SOV/20-127-4-3/60

TITLE: The Method of Nets in the Second Boundary Value Problem for
            Poisson's Equation

PERIODICAL: Doklady Akademii nauk SSSR, 1959,Vol 127,Nr 4,pp 742-745 (USSR)

ABSTRACT: The method used by the author /Ref 4_7 for the approximate
            solution of the two-dimensional Neumann problem for the Laplace
            equation is applied in the present paper to Poisson's equation.
            In the external knots of the net the author applies linear and
            quadratic interpolation of the boundary values of the adjoint
            function, whereby a better exactness is reached, but simultaneous-
            ly the difference operators at the boundary become more complicated.
            Finally the possibility to apply the method for the solution of
            the third boundary value problem is pointed out by an example.
            There are 4 Soviet references.

PRESENTED: April 11, 1959, by S.L.Sobolev, Academician

SUBMITTED: February 10, 1959

Card 1/1

16(1),16(2)

AUTHOR: Lebedev, V.I.   SOV/20-128-4-7/65

TITLE: Estimation of the Error Involved in the Method of Nets for
             Dirichlet's and Neuman' Problems

PERIODICAL: Doklady Akademii nauk SSSR, 1959,Vol 128,Nr 4,pp 665-667 (USSR)

ABSTRACT: The well-known estimations of the error of the method of nets
             are combined with very extensive restrictions with respect to
             the order of increase of the derivatives of the solution in the
             neighborhood of the boundary or similar assumptions. Under weaker
             assumptions the author obtains an estimation of the first
             differences of the errors for the solution of the Dirichlet and
             the Neuman problem. The author mentions Ye.A.Volkov, and N.S.
             Bakhvalov.
             There are 8 references, 7 of which are Soviet, and 1 American.

PRESENTED: May 27, 1959, by S.L.Sobolev, Academician

SUBMITTED: March 31, 1959

Card 1/1

AUTHOR: Lebedev, V. J.

S/020/60/132/05/12/069

TITLE: Evaluation of the Error Involved in the Method of Nets for Neumann's two-dimensional Problem

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 5, pp. 1016-1018

TEXT: The present paper completes the investigations (Ref.6-8) of the author in which he proposed an approximation method for the solution of the two-dimensional Neumann problem. There he gave an estimation of the error of the method which, however, holds only for quadratic interpolation. Now with the aid of the embedding theorems and an inequality from (Ref.4) he gives an estimation of the error which only refers to the interior of the considered domain and which can be also used for linear interpolation. The author states that in the interior of the domain the solutions of the Neumann problem and of the conjugate Dirichlet problem solved with the method of nets possess the same error; for linear interpolation the exactness has the order h^2. An error in (Ref. 8) is corrected.

There are 10 Soviet references.

PRESENTED: February 16, 1960, by S. L. Sobolev, Academician.
SUBMITTED: December 27, 1959

Card 1/1

LEBEDEV, V.I.

Method of nets for the third boundary value problem. Dokl.AN
SSSR 134 no.2:267-270 S '6ᐢ.   (MIRA 13:9)

1. Predstavleno.akad. S.L.Sobolevym.
                (Potential, Theory of)

LEBEDEV, V.I.

Dirichlet and Neumann problems on triangular and hexagonal nets.
Dokl.AN SSSR 138 no.1:33-36 My-Je '61.   (MIRA 14:4)

1. Predstavleno akademikom S.L.Sobolevym.

(Potential, Theory of)

16. 6500

AUTHOR: Lebedev, V. I. (Moscow)

TITLE: On the question of estimating the error in the grid method for polyharmonic equations

PERIODICAL: Zhurnal vychislitel'noy matematiki i matematicheskoy fiziki, v. 2, no. 4, 1962, 593–602

TEXT: Questions of convergence of approximate solutions to polyharmonic equations were discussed by V. K. Saul'ev (Ref. 1: AN SSSR, Vychisl. Matem., no. 1, 1957, 81–86) and the iteration of the approximation by finite difference equations was discussed by E. G. O'yakurov (Ref. 2, 3: AN SSR, Dokl., v. 138 no. 2, 271–274 and v. 138, no. 3, 522–525). Here the question of estimating the error is taken up. The boundary value problem is: $\Delta^m u = 0$ in a planar domain Ω, $B_i \times I_s = \phi_i$, $i = 0, 1, \cdots, m-1$. B_i are differential operators and S is the boundary of Ω.

It is assumed that u belongs to the class $H(p, \lambda, A)$ $(p + \lambda \geq m - \frac{1}{2})$ of all the functions with continuous derivatives up to order p, bounded by A in Ω and (those of order p) satisfying the Hölder condition with exponent λ and constant A.

The main result is an integral estimate for the error in u and its derivatives in the $W_2^{(m)}$ norm. If $\eta_k = u - v_k$ is the error, v_k being the solution of the finite difference equation with respect to a grid with spacing h, then:

Card 1/2

On the question of estimating...

$$\| \eta_h \| W_2^{(m)} = O(h^2) \quad \text{if } p + \lambda > m + 3/2$$

$$= O(h^\gamma) \quad \text{if } m - 1/2 < p + \lambda \leq m + 3/2 \quad (0 \leq \gamma \leq 2).$$

It is shown by an example that the exponent 2 in h^2 cannot be improved. The method used in the proof was introduced by the author (Ref. 14: AN SSSR, Izv., Ser. matem., 1958, 22, 717–734.).

SUBMITTED: January 1, 1962.

Card 2/2

16,6500   16.3500

AUTHOR: Lebedev, V.I.

TITLE: Four-point schemes of elevated accuracy

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 142, no. 3, 1962, 526-529

TEXT: It is shown that for sufficiently smooth solutions u of

$$\Delta u = f \qquad (1)$$

on a hexagonal net there can be given four-point schemes, the error of which is $O(h^3)$ and $O(h^4)$ respectively. The nodes of a hexagonal net D_h with step h in the (x_1, x_2)-plane are divided into the subsets A_h and B_h . If $x_0 \in A_h$, then the three neighboring points of D_h belong to B_h , the neighboring points of these points belong to A_h etc. A_h is further subdivided into A_h^1 and A_h^2 . It is $x \in A_h^1$ if $x \in A_h$ and if the regular hexagon with center in x and corners in the neighboring points of x entirely lies in $\bar{\Omega} = \Omega + \Gamma$, where Ω is the

Card 1/3

Four-point schemes of elevated accuracy   S/020/62/142/003/005/027
C111/C333

definition domain of (1) and Γ the boundary of Ω . The other points of A_h belong to A_h^2 . Let B_h^1 be the subset of those points of B_h which are surrounded by three points from $A_h^1 + A_h^2$, where at least one of these points belongs to A_h^1 . Let $x_0 \in A_h^1$ be origin of coordinates, let

$(0,h)$, $\left(-\frac{\sqrt{3}}{2} h , -\frac{h}{2} \right)$, $\left(\frac{\sqrt{3}}{2} h , -\frac{h}{2} \right)$ be the points $x_1, x_2, x_3 \in B_h^1$

and $x_4, \ldots, x_9 \in A_h^1 + A_h^2$. The schemes of differences are sought with the the set up

$$\Delta_h' u_0 = a_1 f_0 + a_2 \left(\sum f \right)_0 + a_3 h^2 \Delta f_0 \; . \tag{8}$$

$$\tag{14}$$

It is stated that

$a_1 = \frac{3}{4}(1 + a_4)$, $a_2 = \frac{1}{4}(\frac{1}{3} - a_4)$, $a_3 = \frac{3}{16} a_4$, $a_5 = \frac{2}{3}$, $a_6 = \frac{1}{3} - a_4$,

and for $a_4 = 0$ and $a_4 = \frac{1}{3}$ it follow the schemes of differences

Card 2/3

Four-point schemes of elevated accuracy   S/020/62/142/003/005/027
C111/333

$$\Delta_h' u_i = {}^3/4 f_i + {}^1/12 \left(\sum f \right)_i \; , \tag{15}$$

$$\Delta_h' u_i = f_i + \frac{h^2}{16} \Delta f_i \; , \quad i = 0,1,2,3 \; . \tag{16}$$

If u is exactly given in the points of A_h^2 and if u and f have bounded
fifth and third derivatives respectively, then these schemes have an error
$\mathcal{O}(h^3)$.
Under the assumption that u possesses bounded sixth and f bounded fourth
derivatives, the author gives a scheme with $\mathcal{O}(h^4)$.
In the spatial case $(n > 2)$ these schemes have an error $\mathcal{O}(h^2)$.
There are 3 Soviet-bloc references.

PRESENTED: September 9, 1961, by S.L. Sobolev, Academician
SUBMITTED: July 7, 1961

Card 3/3

ACCESSION NR: AP4037250

AUTHOR: Lebedev, V. I. (Moscow)

TITLE: Difference analogs of orthogonal expansions, basic differential operators and certain boundary value problems in mathematical physics. 1

TOPIC TAGS: difference analog, orthogonal expansion, differential operator, boundary value problem, generalized function, orthogonal projection, lattice vector function

ABSTRACT: The author studies structural properties of subspaces of a space of lattice functions and sets up difference equations for certain problems in mathematical physics by a method of orthogonal projections for lattice vector-functions which he proposes and systematically applies. These help to solve the problem of difference analogs of boundary conditions x, using the membership of the solution in a definite subspace of functions, to study the properties of solutions of difference equations, and to give optimal estimates for solutions of difference equations in terms of projection operators on the right parts of these equations. The obtained difference equations for boundary value problems of type I, II and III for self

Card 1/2

ACCESSION NR: AP4037250

adjoint, second order elliptic equations have regular closure of the computational algorithm. For symmetrizing of these systems of equations, they are transformed into known systems of equations of divergent type. The author restricts himself to three-dimensional space, studying in detail the problem for the Laplace operator. He calls the obtained difference equations "difference analogs" of the problems in the desire to stress the fact that he used functional (integral) methods to obtain these equations rather than the concept of local approximation of a differential operator by a difference operator in their derivation. Local approximation is used only in replacement of the first derivative of the function by a central divided difference. With the chosen approach to construction of difference operators, the natural form of approximation is approximation in the weak sense, characterizing as close two functionals which exhibit small random local deviations in approximating a differential operator by a difference, or which exhibit certain rapid oscillations in such an approximation. Both cases can be well treated by the developed method of solution estimates. Orig. art. has: 41 formulas.

ASSOCIATION: none

SUBMITTED: 24Jul62

SUB CODE: MA

DATE ACQ: 09Jun64

NO REF SOV: 026

ENCL: 00

OTHER: 001

Card 2/2

ACCESSION NR: AP4042753   S/0208/64/004/004/0649/0659

AUTHOR: Lebedev, V. I. (Moscow)

TITLE: Difference analogs of orthogonal expansions, basic differential operators, and certain boundary value problems of mathematical physics. 2

SOURCE: Zhurnal vy*chislitel'noy matematiki i matematicheskoy fiziki, v. 4, no. 4, 1964, 649-659

TOPIC TAGS: difference analog, orthogonal expansion, differential operator, boundary value problem, mathematical physics, difference operator, elliptic equation

ABSTRACT: The author studies the properties of difference operators similar to gradient and divergence defined on a cubic grid of n-dimensional space and establishes one of the orthogonal expansions of the space of grid vector-functions. He proposes a method for constructing difference operators with the properties of differential operators of boundary value problems for strongly elliptic systems of second-order equations. By using orthogonal projections he constructs systems of difference equations having regular closure of the computational algorithm. These become systems of second-order difference equations after symmetrization. The notion of local approximation is not used here. Using a concept of S. L. Sobolev

Card 1/3

ACCESSION NR: AP4042753

(Nekotory*ye zamechaniya o chislennom reshenii integral'ny*kh uravneniy. Izv. AN SSSR. Ser. matem., 1956, 20, No. 4, 413-436), he shows strong convergence in $W_2^{(m)}$ (Ω) of the approximate solution to the exact one when $f(x)$, the right parts of the equations, belong to $L_2(\Omega)$. Estimates are obtained for the solutions of these systems in terms of projection operators of the right parts of the equations, and the properties of the operators inverse to operators of gradient and divergence are studied. He shows that they have uniform complete continuity and faithfully approximate the corresponding operators of the exact problem. The proof of convergence as $h \to 0$ of the approximate solutions of many grid problems to the precise solution is equivalent to establishing uniform complete continuity of a sequence of certain difference operators A_h and proof that the sequence A_h faithfully approximates the completely continuous operator A of the exact problem. "The author expresses his gratitude to S. L. Sobolev who succeeded in turning the attention of the author to functional methods of studying difference problems, and he thanks A. A. Dorodny*tsin, O. A. Lady*zhenskaya, A. N. Tikhonov and A. A. Samarskiy for the critical comments they made." Orig. art. has: 17 formulas.

ASSOCIATION: none

Card   2/3

L 45797-65   EWT(d)   IJP(c)
ACCESSION NR: AP5008400   S/0199/65/006/001/0108/0113

AUTHOR: Lebedev, V. I.; D'yakonov, Ye. G.

TITLE: On the application of difference circuits with a decomposed operator for the solution of the third boundary value problem in the case of equations of the parabolic type

SOURCE: Sibirskiy matematicheskiy zhurnal, v. 6, no. 1, 1965, 108-113

TOPIC TAGS: partial differential equation, parabolic equation, approximation method, boundary value problem

ABSTRACT: The applicability of decomposed difference operators to the third boundary value problem is demonstrated for the case of a parabolic differential equation having constant coefficients. A solution is sought for the equation

$$D_0 u = \sum_{i=1}^{2} (a_i D_i^2 u + c_i u) + f(x) \quad \left(D_i = \frac{\partial}{\partial x_i} \right),$$

in a prism $Q_T = \overline{Q} \times [0 \leqslant x_0 \leqslant T]$, where $\overline{Q} = \{x = (x_1, x_2) : 0 \leqslant x_i \leqslant 1; \; i = 1, 2\}$, and

Card 1/2

L 45797-65

ACCESSION NR: AP5008400

satisfying the initial condition $u|_{x_s=0} = \varphi(x)$ and conditions on the boundary Γ of

the domain Ω:

$$D_s u + b_s u = \psi_s(x), \quad s = 1, 2,$$

where $x \in \Gamma$, $a_s > 0$, b_s — are functions constant along the boundary $x_s = 0, 1$;

$$b_s|_{x_s=0} < 0, b_s|_{x_s=1} > 0.$$

The network solution is estimated in the metric of a positive definite quadratic form and is given in terms of the right member of an equation in divergent form. The algorithms proposed may be used in iterative methods of solution for the difference analog of the steady-state problem. It is extended to domains made up of rectangles with their sides parallel to the coordinate axes. Orig. art. has: 23 formulas.

ASSOCIATION: none

SUBMITTED: 06Apr64   ENCL: 00   SUB CODE: MA, DP

NO REF SOV: 011   OTHER: 000

Card 2/2

L 52723-65   EWT(1)/EEC(k)-2/T/EEC(b)-2/EWA(h)   Pm-4/Pz-6/Peb   LJP(c)

ACCESSION NR: AP5013344   UR/0109/65/010/005/0903/0912

AUTHOR: Lebedev, V. I.

TITLE: Peculiarities of transistorized circuits under micro-operation conditions

SOURCE: Radiotekhnika i elektronika, v. 10, no. 5, 1965, 903-912

TOPIC TAGS: transistor, transistorized circuit, micro operation

ABSTRACT: The effect of the emitter-junction voltage (100—800 mv) on the collector and base currents was experimentally determined for a number of Soviet-made transistors (P4D(, P4D5, P5D2, and others). From these characteristics, transistor parameters were derived, and the following conclusions drawn: (1) Under micro-operation conditions, the input resistance of a transistor circuit is high: $R_{in} = (m\varphi / I_{col})\beta$, m reaching a value as high as 1.5 for silicon diodes carrying currents of 10—200 µamp. (2) The output resistance of a saturable switch is high, particularly with currents under 50 µamp; with $N > 0.5$, the output

Card 1/2

L 52723-65
ACCESSION NR: AP5013344

resistance depends only slightly on the saturation. (3) The current, voltage, and power gains are rather low because of a low $\bar{\beta}$ and high R_{in}; a decrease of $\bar{\beta}$ with current results in a limited load capacity and tolerances of the circuit resistors and power supply. (4) Testing of computer components has shown that P502 and P105 silicon transistors may be used with currents 200 μamp and higher; the limit of applicability of germanium P402 and P416 transistors is set by the current 100 μamp with a load capacity n = 3, tolerances δ_E = ± 50%, δ_R = ± 30%, ΔT = ± 60C, and a power of 2 mw or less per component. "The author wishes to thank I. P. Stepanenko who emphasized the necessity for this investigation, T. M. Agakhanyan for his valuable advice, and also L. M. Kamenetskiy for his part in the experimental work." Orig. art. has: 9 figures, 17 formulas, and 2 tables.

ASSOCIATION: none   [03]

SUBMITTED: 28Feb64   ENCL: 00   SUB CODE: EC

NO REF SOV: 000   OTHER: 006   ATD PRESS: 4011

Card 2/2

LEBEDEV, V.I.

    Anniversary of an outstanding scientist. Vest. LGU 20 no.24:
                                                   (MIRA 19:1)
    152   '65.

L 53808-65   EWT(d)   LJP(c)
ACCESSION NR: AP5014755

UR/0208/65/005/003/0454/0462
518:517.949.12

AUTHORS: Lebedev, V. I. (Moscow); Baburin, O. V. (Moscow)

TITLE: Computation of integrals in the sense of principal value, weights, and nodes of quadrature formulas of Gauss

SOURCE: Zhurnal vychislitel'noy matematiki i matematicheskoy fiziki, v. 5, no. 3, 1965, 454-462

TOPIC TAGS: integration, numerical analysis

ABSTRACT: The authors consider a quadrature formula for

$$\int_{-1}^{1} \frac{f(x)}{x}\,dx$$

(principal value). They obtain a table of weights and nodes for n = 2(1)101, but in the paper they give values for only n = 60, 100, 101. They relate their formula to that of Gauss, and give an upper bound for their computational error (which is conservative by a factor of about 10). Orig. art. has: 14 formulas and 3 tables.

Card 1/2

L 53808-65

ACCESSION NR: AP5014755

ASSOCIATION: none

SUBMITTED: 24Apr64   ENCL: 00   SUB CODE: MA

NO REF SOV: 004   OTHER: 005

Card 2/2

L 43192-65   EEC(b)-2/EWG(r)/EEC(k)-2/EWA(h)/EWA(k)/EWP(k)/EWT(1)/EWT(m)/
EEC(t)/FBD/EWP(1)/T/EWA(m)-2/EWP(e)   Pf-4/P1-4/P1-4/Pm-4/Pn-4/Po-4/Peb
ACCESSION NR: AP5010041 , IJP(c)   WH/WG   UR/0368/65/002/002/0132/0137

AUTHOR: Pilipovich, V. A.; Lebedev, V. I.; Morgun, Yu. F.

TITLE: Determination of losses in lasers

SOURCE: Zhurnal prikladnoy spektroskopii, v. 2, no. 2, 1965, 132-137

TOPIC TAGS: laser loss, laser efficiency, laser pump threshold, ruby laser, laser

ABSTRACT: In view of experimental and theoretical difficulties inherent in earlier
methods, the authors propose a new method for determining the total loss in lasers.
It is based on determining the ratio of the laser output power to the pump power in the
range in which the threshold pump energy (defined as the energy necessary to pro-
duce a single spike) is linearly proportional to the level inversion population.
The latter range was measured experimentally for two rubies of equal size, with
the useful losses varied by replacing one of the resonator mirrors. The equations
derived were used to determine the harmful losses, the efficiency of the active
medium, the efficiency of the illuminator, and the laser gain. Tables are presented
of the harmful loss as a function of the pump power and of the laser efficiency

Card 1/2

L 43192-65
ACCESSION NR: AP5010041

as a function of the pump power and of the percentage pump power of one ruby laser.
"We are deeply grateful to Academicians of the AN BSSR A. N. Sevchenko and B. I.
Stepanov for interest in the work and useful advice." Orig. art. has: 2 figures,
13 formulas, and 1 table.
[02]

ASSOCIATION: none

SUBMITTED: 03Aug64   ENCL: 00   SUB CODE: EC

NO REF SOV: 003   OTHER: 005   ATD PRESS: 3242

Card 2/2

L 7072-66   EWA(k)/FBD/EWT(1)/EEC(k)-2/T/EWP(k)/EWA(m)-2/EWA(h)   SCTB/IJP(c)

ACC NR: AP5026320   WG   SOURCE CODE: UR/0368/65/003/004/0342/0349

AUTHOR: Lebedev, V. I.; Pilipovich, V. A.

ORG: None

TITLE: The determination of boundary losses in lasers

SOURCE: Zhurnal prikladnoy spektroskopii, v. 3, no. 4, 1965, 342-349

TOPIC TAGS: laser, laser beam, light reflection coefficient, resonator, laser energy

ABSTRACT: The present paper proposes that the harmful laser losses be divided
into those within the inner rod due to scattering and inactive absorption, and boundary losses
in the resonator due to the divergence of the laser beam. Formulas for the calculation of the
boundary loss factor are derived using an effective reflection coefficient of laser resonator
mirrors. The theoretical predictions are compared with experimental data reflecting the
changes in boundary losses caused by variations in the length of the laser resonator. Results
indicate that the boundary losses constitute the major portion of harmful laser losses. The
authors thank A. S. Rubanov (who derived Equation (10a) of the article) for his valuable advice
during the discussion of the luminescence amplification. Orig. art. has: 13 formulas and 4
figures.   [08]

SUB CODE: EC / SUBM DATE: 01Apr65 / ORIG REF: 005 / OTH REF: 003/   ATD PRESS:

nw

Card 1/1   UDC: 535.89

L 22684-66   FBD/EWT(1)/EWP(e)/EWT(m)/EEC(k)-2/T/EWP(k)/EWA(h)   IJP(c)   WG/WH

ACC NR: AP6010447   SOURCE CODE: UR/0368/66/004/003/0236/0239

AUTHOR: Pilipovich, V. A.; Bogdanovskaya, L. A.; Lebedev, V. I.

ORG: none

TITLE: Determination of losses in a ruby laser with a detuned resonator

SOURCE: Zhurnal prikladnoy spektroskopii, v. 4, no. 3, 1966, 236-239

TOPIC TAGS: ruby laser, laser resonator, resonator loss, resonator mirror, mirror alignment

ABSTRACT: Losses in a detuned resonator were determined experimentally by studying the threshold excitation energy as a function of the mirror alignment angle in resonators of various lengths. Measurements were carried out on a ruby laser consisting of a rod 65 mm long and 12 mm in diameter. One of the resonator mirrors was coated with a multilayer dielectric whose coefficient of reflection was 1. The other mirror was 92% reflective and could be rotated around the vertical axis by any angle from 0 to 2°. The mirror angle accuracy was checked by a collimator within 3 sec of arc. In order to reduce the effect of Fresnel scattering, the second ruby end was coated. It was established that the minimum distance between mirrors at which nonaxial (undesirable) modes were not observed was 35 cm. Losses induced by resonator

Card 1/3   UDC: 535.89

L 22684-66

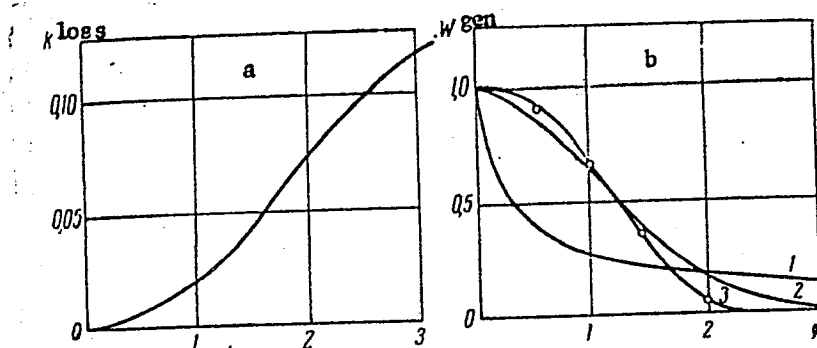ACC NR: AP6010447   0

Fig. 1.   Dependence of the coefficient of losses K_{loss} (cm^{-1}) (a) and the generation power W_{gen} (rel. units) (b) of a laser on the angle of alignment of the resonator mirror γ (min)

1 - Theoretical curve from B. I. Stepanov and A. P. Prishvalko. ZhPS, 1, 333, 1964; 2 - curve calculated according to a formula from B. I. Stepanov and V. P. Gribkovskiy. UFN, 82, 201, 1964, taking into account changes of the loss coefficient on Fig. 1a; 3 - experimental curve.

Card 2/3

L 22684-66
ACC NR: AP6010447

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detuning were determined experimentally from a comparison of the
threshold excitation energy for various values of useful losses (using
mirrors with different reflection coefficients) and for various mirror
alignments. The pumping conditions and the resonator base were not
varied. The results are indicated in Fig. 1. The generated power
(curve 2), calculated and adjusted for losses by means of the proba-
bility method formula derived by B. I. Stepanov and V. P. Gribkovskiy
(UFN, 82, 201, 1964) compares favorably with the experimental data
(curve 3), although it is at variance with theoretical data calculated
by Stepanov and A. P. Prishvalko (ZhPS, 1, 333, 1964) for gas and
neodymium glass lasers. Orig. art. has: 4 figures.   [YK]

SUB CODE: 20/   SUBM DATE: 19Jul65/   ORIG REF: 008/   ATD PRESS:4228

Card 3/3 BK

USSR/Physics   Dec 48
    Density
    Elements

"Density of Elements in the Solid State," V. I.
Lebedev, 3½ pp

"Dok Ak Nauk SSSR" Vol LXIII, No 5 - p.515-18

Constants characterizing physical properties of
elements, if such elements are examined for certain
groups of a periodic system, generally increase or
decrease monotonically. Gives a specimen table for
alkali metals. Exceptions are noted for the
density of beryllium and magnesium. Submitted by
Acad S. I. Vavilov 26 Oct 48.

                                        55/49T87

LEBEDEV, V. I.

PA 35/49T96

USSR/Physics

Specific Heat

Fluorine

Dec 48

"Specific Heat of Elements," V. I. Lebedev, 4 pp

"Dok Ak Nauk SSSR" Vol LXIII, No 6

Graph shows specific heats and specific volumes
for elements of the third group, revealing that
the curves are very similar. Concludes that since
specific volume follows the periodic law, specific
heat for elements must also follow it. Uses this
to determine specific heat for several elements
(these specific heats have not yet been measured):
fluorine in the solid state, strontium, barium,
and subgroups of scandium. Submitted by Acad S. I.
Pavllov, 26 Oct 48.

35/49T96

LEBEDEV, V. I. and MARKOV, M.

USSR/Nuclear Physics - Mesotrons,

Nuclear Physics - Mesotrons, Pair

Capture by Nuclei   Apr 49

Production

"The Capture of Negative Mesons by Atomic Nuclei From the Standpoint of the Pair Theory of Nuclear Forces," V. Lebedev, M. Markov, Moscow State U; Phys Inst imeni P. N. Lebedev, Acad Sci USSR, 5 pp

"Zhur Eksper i Teoret Fiz" Vol XIX, No 4

Attempts to clarify experimental data on meson capture by atomic nuclei using the pair theory of meson forces. Concludes that negative meson will be captured by Fe56, Al27, and S32 nuclei with probability greater than the probability of spontaneous disintegration of the meson in the energy interval from -2 MeV to 0. The capture of mesons by C12 and Be7 nuclei for the same stipulations is absolutely forbidden. Submitted 10 Jul 48.

38/49T101

4092   Capture of Slow β Electrons in Outer Orbits of Heavy Atoms. D. Ivanenko and V. Lebedev. Zhur. Eksptl. i Teoret. Fiz. 20, 91-2(1950)(Letter to the editor, in Russian).

Recent studies of the spectra of soft β particles (Lecoin et al, Compt. rend. 217, 106(1043); ibid. 227, 121(1948)) have shown that the value of the decay probability, as measured directly from the decrease of activity, differs considerably from the value obtained from recurrence formulas for the members of the radioactive family in equilibrium. Several authors (Daudel et al, Compt. rend. 224, 1427(1047); ibid. 225, 290(1947); J. phys. radium 8, 238(1947); Sherk, Phys. Rev. 75, 780(1949)) have attributed this effect to a new type of β decay, which is a "K-creation" or an immediate capture of the electron into one of the atomic levels of the discrete spectrum. However, such a process could hardly affect the probability of the decay by more than a few per cent, because of the almost total orthogonality of the wave functions of the electrons in the shells of heavy nuclei Z and Z+1. An attempt is made here to explain the phenomenon in question by a different mechanism, viz., by a capture of an already emitted β particle into an outer shell of an atom, this process being accompanied by an emission of a photon.

LEBEDEV, V.

USSR/Nuclear Physics - Mesons   21 Sep 51

"Brief Generation of Mesons," D. Ivanenko, V.
Lebedev, Moscow State U imeni Lomonosov

"Dok Ak Nauk SSSR" Vol LXXX, No 3, pp 357-360

Concludes that the nonlinear form of expression
for the energy of bond between nucleons and
mesons is essential to nonlinear mesodynamics,
which expression appears as the result of the
expansion of a certain closed expression. Sub-
mitted 25 Jul 51 by Acad D. V. Skobel'tsyn.

210T75

IVANENKO, D., LEBEDEV, V.

Nuclear Physics

Multiple processes in reciprocal action. Zhur. eksp. i teor. fiz. 22 No. 5, 1952.

9. Monthly List of Russian Accessions, Library of Congress, December 1952. Unclassified.

LEBEDEV, V.I.

SUBJECT   USSR / PHYSICS   CARD 1 / 2   PA - 1955
AUTHOR   KALAŠNIKOVA,V.I., LEBEDEV,V.I., SPIVAK,P.E.
TITLE   Relative Measurements of the Average Number of Neutrons which are

Emitted on the Occasion of the Fission of U^{233}, U^{235} and Pu^{239} by Thermal Neutrons and by Neutrons of the Fission Spectrum.

PERIODICAL Atomnaja Energija, 2, fasc.1, 18-21 (1957)
            Issued: 3 / 1957

The energies of most neutrons are between 10^5 and $(5-6).10^6$ eV, and the average energy amounts to about 2 MeV. Although the results of such experiments are not directly suited for the computation of fission processes, they are nevertheless interesting both from the general point of view and from that of the development of the chain reaction.

Experimental method: The increase of ν (= average number of fast neutrons corresponding to one fission act) with an increase of the neutrons causing the fission was investigated by the method of the simultaneous counting of the number of fission acts in the material to be investigated and of the number of coincidences of the fragments with the fission neutrons. The reactor of the RFT (?) served as a neutron source.

Measurements and measuring results: For the purpose of determining the ratio (ν / ν_m) the values of $\nu \omega \eta$ for all three isotopes were one after the other measured by means of a converter in the depth and by means of a boron filter at the output from the channel, and the values of $\nu_T \omega \eta$ were measured in

an open bundle without a converter. Here ν and ν_T refer to fission by fast and slow neutrons respectively. Measuring results are shown in a table. Two series of measurements were carried out for each isotope; their results agree within the statistic limits of errors ($\sim 1\%$). Also the methodical errors caused by a possible instability of the neutron detector were much less than 1%. When dealing with the results for Pu^{239} the presence of a slight admixture of Pu^{240} in the target was taken into account, which led to the forming of a background of spontaneous fissions. The latter amount to about 2,5% of the number of fissions of Pu^{239} caused by fast neutrons. The correction which took the background of spontaneous fissions into account amounted to $\sim 1\%$.

On the occasion of a comparison between the average number of neutrons emitted on the occasion of the fission of U^{233}, U^{235} and Pu^{239} by thermal neutrons with these caused by neutrons of the fission spectrum the following was found: in the case of all isotopes investigated ν increases by about 10%, on which occasion ν depends somewhat less on energy in the case of U^{233} than in the case of U^{235} and Pu^{239}. For a more close investigation of the dependence of the amount of ν on the excitation energy of the fissioning nucleus it is necessary to examine the energy dependence of ν on the occasion of fission by monochromatic neutrons.
INSTITUTION:

GERASIMOV, V.F. [translator]; LEBEDEV, V.I. [translator]

[Advances in the field of nuclear energy] Uspekhi v oblasti
iadernoi energii. Moskva, Izd-vo inostr.lit-ry, 1958. 1 v.
            (Nuclear engineering)   (MIRA 13:7)

AUTHORS: Lebedev, V. I., Kalashnikova, V. I.   SOV/89-5-2-13/36

TITLE: The Average Number of Neutrons Emitted in the Fission of Am^{241} by Thermal Neutrons (Sredneye chislo neytronov, ispuskayemykh pri delenii Am^{241} teplovymi ncytronami)

ABSTRACT: The measuring method used was described in detail (Ref 2). The ratio of the neutrons released per fission of Am^{241} and U^{235} was measured as amounting to:

$$\frac{\gamma(Am^{241})}{\gamma(U^{235})} = 1,27 \pm 0,01 \quad .$$

If $2,47 \pm 0,03$ is used for $\gamma(U^{235})$, the value of $3,14 \pm 0,05$ is obtained for $\gamma(Am^{241})$.

The fission effect exercised by fast neutrons upon Am^{241} was not taken into account, as the neutron beam used was filtered by boron and as the fast neutrons therefore would cause only a smearing of the measuring result which is smaller than the measuring error when measuring the ratio $\gamma(Am^{241}) / \gamma(U^{235})$. There are 2 references, 1 of which is Soviet.

Card 1/2

21(7)

AUTHORS: Lebedev, V. I., Kalashnikova, V. I.   SOV/56-35-2-46/60

TITLE: The Average Number of Neutrons Emitted in the Fission of
                Th^{229} by Thermal Neutrons (Sredneye chislo neytronov, is-
                puskayemykh pri delenii Th^{229} teplovymi neytronami)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958,
                Vol 35, Nr 2(8), pp 535-537 (USSR)

ABSTRACT: A thorium preparation (weight 1,5 mg) which contains ~ 10 %
                Th^{229} was used for the determination of the average number
                ν of neutrons emitted in the fission of Th^{229} by thermal
                neutrons. This preparation was fastened to thin platinum foil
                and this foil was placed together with the preparation into
                a flat ionization chamber. This chamber, in turn, was placed
                onto the axis of the beam of the slow neutrons of a reactor.
                Simultaneously with the fragments produced by the fission
                of Th^{229} by thermal neutrons, also the fast neutrons emitted
                by the excited fragments were recorded by means of BF_3 counters.
Card 1/2   Carrying out of measurements is discussed in short. Several

The Average Number of Neutrons Emitted in the Fission of
Th^{229} by Thermal Neutrons

series of measurements gave the ratio $\nu(Th^{229})/\nu(U^{235}) =$
$= 0,864 \pm 0,008$ of the numbers of the neutrons which are
emitted in one act of the fission of Th^{229} and U^{235} by thermal
neutrons. With the value $\nu(U^{235}) = 2,47 \pm 0,03$ one obtains
$\nu(Th^{229}) = 2,13 \pm 0,03$. A comparatively strong effect of the
fission of Th^{229} by slow neutrons with energies between
0,5 eV or with some dozens of eV was observed (with respect
to the effect of the fission of U^{235}). There are 6 references,
2 of which are Soviet.

SUBMITTED: May 10, 1958

Card 2/2

εε006

S/089/61/010/004/008/027
B102/B212

26.2245

AUTHORS: Lebedev, V. I., Kalashnikova, V. I.

TITLE: Mean number of neutrons produced in Np^{237} fission by fast neutrons

PERIODICAL: Atomnaya energiya, v. 10, no. 4, 1961, 371-372

TEXT: The mean number ν of neutrons produced in Np^{237} fission by fast neutrons has been measured relative to the known ν-value of U^{235}. The fission fragments have been recorded by an ionization chamber and the fast neutrons by a detector (a group of $B^{10}F_3$ counters arranged in a moderator). ν has been determined by the method of coincidence of the pulses of fragments and fast neutrons. Np^{237} fission served as fast-neutron source, with a converter of U^{235} which was arranged in the neutron field near the reflector of an PФT (RFT) reactor. The Np preparation used has been separated chromatographically from the fissile admixtures. The target was an Np^{237} layer of 1 mg/cm², deposited on both sides of a Pt foil (7μ). Each of these layers contained about 20 mg of material. The standard target of U^{235} had also been made in the form of a two-sided layer (0.3 mg/cm² on an Al foil).

Card 1/3

22605

S/089/61/010/004/008/027
B102/B212

Mean number ...

The counting rate of the Np^{237} fission fragments in the ionization chamber amounted to 4-5 sec^{-1}, and that of the true pulse coincidences was 0.6-0.7 sec^{-1}. $\nu(Np^{237})$ and $\nu_T(U^{235})$ (the ν-value of uranium has been determined in a thermal-neutron-induced fission) have been measured in several series. The possible error (affection of the activity of the neutron detector) due to the anisotropy in the angular distribution of Np^{237} fission fragments has been determined and was found to be small compared to the normal error in measurement. The test results are compiled in the table. The desired ratio was equal to $\nu(Np^{237})/\nu_T(U^{235}) = 1.197 \pm 0.012$. Using $\nu_T(U^{235}) = 2.47 \pm 0.03$, $\nu(Np^{237})$ was found to equal 2.96 ± 0.05. This value was compared with that found by other authors. Rough estimates suggest that also $\nu(Np^{237})$ satisfies the linear $\nu(E_n)$ rule. The authors thank the radio-chemists V. K. Markov, Ye. I. Rzhekhina, V. F. Gorbunov, and F. I. Khlebnikov for the high-purity Np preparation and the high-quality targets. There are 1 table and 7 references: 6 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: D. Hughes, R. Schwartz, Neutrons Cross Section, BNL-325, Suppl. No. 1, January 1, 1957, p. 5.

Card 2/3

L 10216-63   EWT(d)/EWT(m)/FCC(w)/BDS--
AFFTC/ASD--IJP(C)
ACCESSION NR: AP3000043   S/0056/63/044/005/1509/1517

AUTHOR: Danilov, G. S.; Lebedev, V. I.

TITLE: Calculation of the doublet neutron-deuteron scattering length in the
theory of zero-range forces

SOURCE: Zhurnal eksper. i teoret. fiziki, v. 44, no. 5, 1963, 1509-1517

TOPIC TAGS: Neutron-deuteron scattering, zero-range theory, three-particle
wave functions

ABSTRACT: A method is proposed for numerically solving the equations of
Ter-Martirsoyan and Skornyakov (Zhurnal eksperimental'noy i teoreticheskoy
fiziki, vol. 31, 775, 1956) for the determination of the wave function of a
three-particle system in the limiting case of zero range of the forces, for
$S = 1/2$. The value obtained for the neutron-deuteron scattering range is 0.48
times 10 sup -13 centimeter and is in satisfactory agreement with the
experimental value of Hurst and Alcock (Can. J. Phys. vol. 29, 36, 1951). The
calculations are restricted to the case where the energy of the incident neutron

Card   1/2

L 10216-63
ACCESSION NR: AP3000043   6

is lower than the disintegration energy of the deuteron, so that only elastic
scattering is possible. The equations derived in the paper were solved on an
electronic computer. "The authors thank S. A. Frolova, L. F. Kananikhina, and
L. S. Tint for participating in setting up the computational program, and T. Yu.
Aandriyevskaya for carrying out some preliminary calculations. One of the
authors (Danilov) is grateful also to K. A. Ter-Martirosyan and V. K.
Vaytovetskiy for help in organizing the calculation and for constant interest in
this work and comments." Orig. art. has: 57 formulas.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe, Akademii nauk SSSR
(A. F. Ioffe Physicotechnical Inst. Acad. Sci. SSSR)

SUBMITTED: 12Oct63   DATE ACQ: 12Jun63   ENCL: 00

SUB CODE: PH   NR REF SOV: 005   OTHER: 001

Card 2/2

LEBEDEV, V, I.   C-5

Category : USSR/Nuclear Physics - Nuclear Reactions

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3240

Author   : Kalashnikova, V.I , Lebedev, V.I., Mikaelyan, L.A. Pevzner, M.I.
Title   : Number of Neutrons Emitted by Pu239 Fissioned by Thermal and
           Superthermal Neutrons.

Orig Pub : Atom. enirgiya, 1956, No 3, 11-12

Abstract : A comparison was made of the average number V of neutrons emitted
           upon fission of Pu^{239} by thermal neutrons and by neutrons in the
           energy range of 0.15 -- 0.5 ev, corresponding to resonance in the
           formation of the intermediate Pu^{240} nucleus. The work was per-
           formed with a neutron beam emerging from the reflector of the RFT
           reactor. The procedure for the relative measurements of V was
           described previously (Referat. Zh. Fizika, 1950, 16204). The resonant
           neutrons were separated with filters made of Cd and Gd.
               The measurements have shown that in the range of energies under in-
           vestigation the value of V remains constant (with accuracy to within
           2%). This result agrees with data by Leonard et al (Leonard, B.R. Jr.
           et al, Bull. Am. Phys. Soc., 1956, 1, No 1, A2) and Auclair et al
           (Auclair, J-M., et al, C.r. Acad. Sci. 1955, 241, 1935) and contradicts

Card   : 1/2

Category : USSR/Nuclear Physics - Nuclear Reactions

C-5

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3240

the report by Zimmerman et al (Zimmerman, R.L. et al, Bull. Am. Phys. Soc., 1956, $\underline{1}$, No 1, Al) concerning a 12% reduction in the value of $\sqrt{}$ in the resonant region at 0.3 ev.

Card   : 2/2

712

ON THE NUMBER OF NEUTRONS EMITTED BY Pu239 ON
FISSION BY THERMAL AND SUPERTHERMAL NEUTRONS.
V. I. Kalashnikova, V. I. Lebedev, L. A. Mikaelian, and
M. I. Pevzner. Soviet J. Atomic Energy, No. 3, 291-3(1956).
    The average number of neutrons emitted on fission of
Pu239 by thermal and superthermal neutrons (E_w from 0.15
to 0.5 ev) is measured. (nath)

Lebedev V. I.

Number of neutrons emitted by plutonium-239 upon thermal and epithermal neutron induced
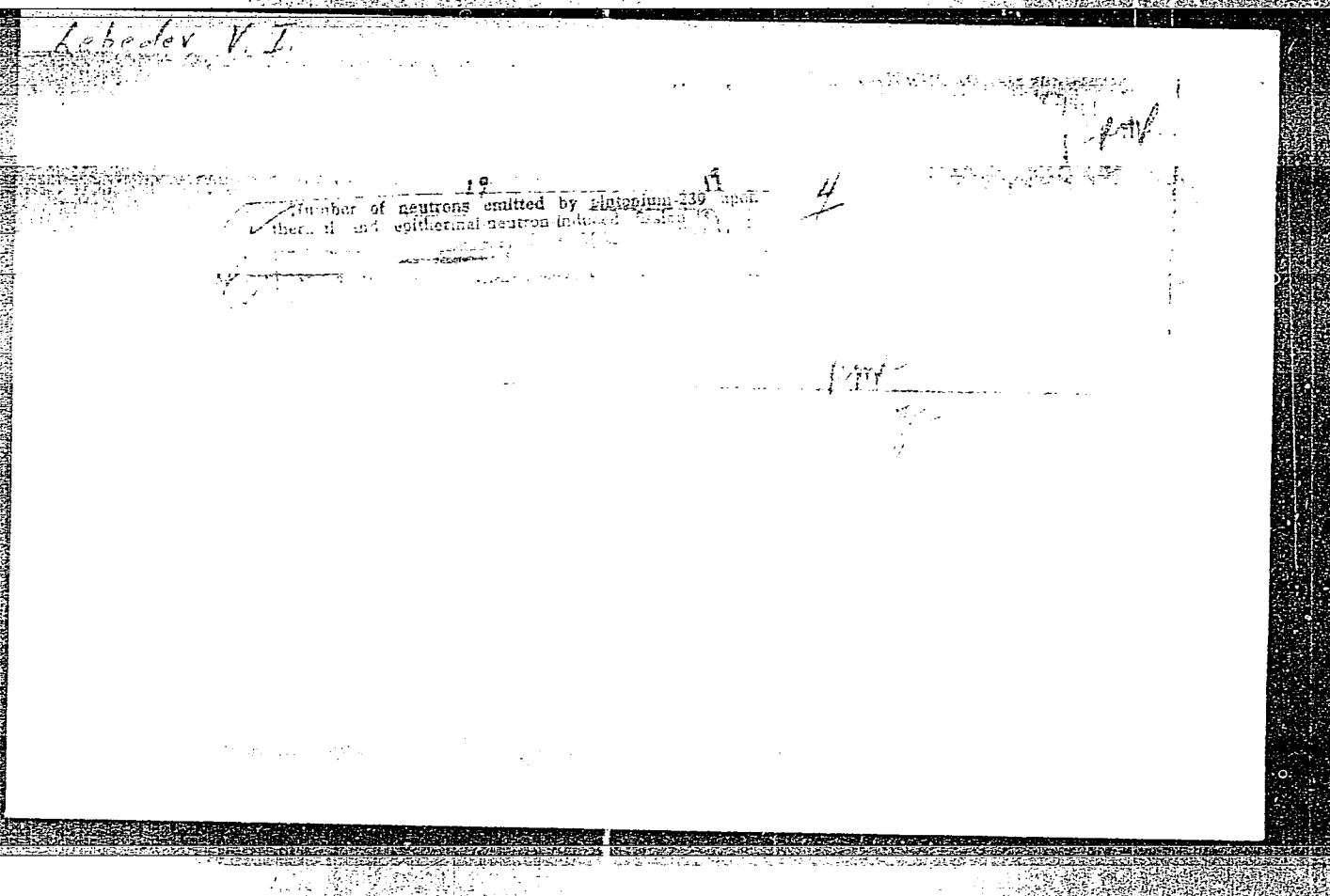
24,6600

39675
S/056/62/043/001/045/056
B102/B104

AUTHORS: Apalin, V. F., Gritsyuk, Yu. N., Kutikov, I. Ye., Lebedev, V.
            I., Mikaelyan, L. A.

TITLE: The number of neutrons emitted from U^{236*} in the region of
            symmetrical fission

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43,
            no. 1(7), 1962, 329-330

TEXT: Results hitherto obtained by studies on the dependence of fission
neutrons on the fragment mass ratio are rather inaccurate. In order to
obtain more reliable data, the authors investigated thermal-neutron
induced U^{235} fission using a double ionization chamber. In the case of
maximum distribution and symmetrical fission, the fragment yield ratio
was ~210 (true value 600). The fission neutrons were detected in 4π-
geometry. The total number of fission neutrons recorded at a rate of
~25 fissions/sec was $\approx 4 \cdot 10^5$. The kinetic energy E_k of the fragments and
the number ν of neutrons were studied in dependence of the mass ratio
Card 1/2   * PROBABLY SHOULD BE U^{235}

The number of neutrons emitted from ...   S/056/62/043/001/045/056
B102/B104

$X = M_n/M_1$. A distinct correlation was established between $E_k(X)$ and $\nu(X)$. ν reaches a minimum at $X = 1.20-1.25$ which practically coincides, with the E_k maximum. It is of interest that $\nu(X)$ becomes the larger the more symmetrical fission is approached, so that $3.6 + 0.2$ neutrons/decay event are observed in the X-region from 1.00 to 1.04 (first analyzer channel). A considerable difference exists between ν in symmetrical fission and fission in the region of X, which corresponds to the E_k maximum: $\nu_{max} - \nu_{min} = 1.6 \pm 0.2$ n. If the losses due to insufficient resolution of the mass analysis are taken into account, the true ν-values exceed by far the ones measured. Hence about 6 neutrons are emitted in symmetrical fission. There is 1 figure.

SUBMITTED: April 14, 1962

Card 2/2

24.6600

AUTHORS:

44227
S/056/62/043/006/015/067
B102/B104

Apalin, V. F., Gritsyuk, Yu. N., Kutikov, I. Ye.,
Lebedev, V. I. Mikaelyan, L. A.

TITLE:

Number of neutrons emitted from U^{234} and Pu^{240} in symmetric
fission

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43,
no. 6(12), 1962, 2053-2055

TEXT: Layers of uranium or plutonium (5-6 $\mu g/cm^2$) were deposited on
collodion films (~5 $\mu g/cm^2$), coated with gold (~10 $\mu g/cm^2$) and exposed
to a neutron beam from the thermal column of a reactor. The fission
neutrons were detected in almost perfect 4π geometry with a double
ionization chamber. A mass-ratio analyzer registered all fragments with
$E \geq 30$ Mev; the fragment counting rate was 20-30 pulses/sec. E_c, the
kinetic fragment energy, was plotted against the fragment mass ratio, and
the numbers ν of fission neutrons were plotted in the same diagrams. It
can be seen that ν has a minimum where E_c has a maximum. In the case of
Card 1/2

S/056/62/043/006/015/067
B102/B104

Number of neutrons emitted from ...

symmetric fission ν reaches a maximum; $\Delta\nu = \nu_{max} - \nu_{min} = 1.80 \pm 0.25$ for U^{234} and $\Delta\nu = 1.10 \pm 0.2$ for Pu^{240}. For U^{236} $\Delta\nu = 1.6 \pm 0.2$ had been obtained (ZhETF, 43, 331, 1962). Owing to effects of the apparatus these values are far from the true ones. Taking those effects into account $\Delta\nu = 4.0 \pm 0.7$, 4.4 ± 0.6, and 3.2 ± 0.6 for U^{234}, U^{236} and Pu^{240}. There is 1 figure.

SUBMITTED: July 16, 1962

Card 2/2

ACCESSION NR: AT4019042   S/0000/63/000/000/0142/0143

AUTHOR: Lebedev, V. I.; Stepanov, P. Ye

TITLE: Representation of the decay curves of fission fragments by functions of the assigned type (e super bt)

SOURCE: Voprosy* fiziki zashchity* reaktorov; sbornik statey (Problems in physics of reactor shielding; collection of articles). Moscow, Gosatomizdat, 1963, 142-143

TOPIC TAGS: nuclear reactor, reactor shielding, radiation decay, decay curve, fission fragment decay curve, e super bt function

ABSTRACT: In order to represent the decay curves of fission fragments, obtained experimentally, in the form of the sum of functions of an assigned type, the following problem is solved in this article. Given a function of two variables (b, t), limited in a rectangle, $[b \leqslant b \leqslant b']$ $[t_0 \leqslant t \leqslant T]$, rather smooth and such that any system of functions $\varphi(b_j, t)$ at different b_j is linearly independent on the segment $[t_0, T]$; let the function $f(t)$ be given on segment $[t_0, T]$ at points $t = t_i$ $(i = 0, 1, \ldots, N)$. The following expression is designated through $E = E(t_0, T, n, p_i, a_j, b_j)$:

$$ E = \left(\sum_{i=0}^{N} \left[f(t_i) - \sum_{k=1}^{K} a_k \varphi(b_k t_i) \right]^2 p_i \right)^{1/2}, \qquad (1) $$

Card 1/2

ACCESSION NR: AT4019042

where $p_i \geqslant 0$ are weights normed in a definite manner and selected on the basis of the required character of the approximation. The following problems are posed and solved in the article: (1) for given $E_1 > 0$, n_1, find the minimal $n(n_1 \leqslant n)$ at which $\min_{a_k, b_k} E < \varepsilon_1$;

(2) for given n find $\min_{a_k, b_k} E$; a_k, b_k; (3) for given n, b_k (k = 1, 2, ..., n) find $\min_{a_k} E$. The first and second problems are nonlinear: the third is linear. For the solution of the first and second problems the author employs a gradient iteration converging process with automatic selection of step increment. A program for the algorithm described in the paper was compiled for use with the delectronic digital computer M-20. This program was then used to develop decay curves of fission fragments of U^{235}. The curves were presented with an accuracy of 5% in the form of sums of $\sum a_k e^{-b_k t}$. Orig. art. has: 5 formulas.

ASSOCIATION: none

SUBMITTED: 14Aug63

DATE ACQ: 27Feb64

ENCL: 00

SUB CODE: NP

NO REF SOV: 001

OTHER: 000

Card 2/2

ACCESSION NR: AP4031137   S/0056/64/046/004/1197/1204

AUTHORS: Apalin, V. F.; Gritsyuk, Yu. N.; Kutikov, I. Ye.; Lebedev, V. I.; Mikaelyan, L. A.

TITLE: On the number of neutrons emitted by U-235 fission fragments

SOURCE: Zh. eksper. i teor. fiz., v. 46, no. 4, 1964, 1197-1204

TOPIC TAGS: uranium 235, symmetrical fission, asymmetrical fission, neutrons emitted by fragments, fragment kinetic energy, nucleus excitation energy, total energy release, fragment mass ratio

ABSTRACT: Continuing earlier measurements of the total number of neutrons emitted by both fragments in the case of fission of U^{233}, U^{235}, and Pu^{239} by thermal neutrons (ZhETF v. 43, 329 and 2053, 1962), the authors have repeated the experiments on U^{235} with equipment that provided greater resolution in mass analysis, so as to obtain a quantitative agreement between the increase in the excitation

Card 1/4

ACCESSION NR: AP4031137

energy and the decrease in the kinetic energy. The new equipment
constituted an ionization chamber and a cadmium-containing neutron
detector. Comparison of the data for U^{235} with those for Cf^{236}
refutes the hypothesis advanced by Terrel (Phys. Rev. v. 127, 880,
1962) that the number of neutrons varies with the fragment mass in
the same fashion for all nuclei. Calculations show that in the re-
gion of symmetrical fission the excitation energy of the fragments
increases by about 20 MeV. Orig. art. has: 3 figures and 1 formula.

ASSOCIATION: None

SUBMITTED: 27Sep63   DATE ACQ: 07May64   ENCL: 02

SUB CODE: PH, NS   NO REF SOV: 003   OTHER: 012

Card 2/4

LEBEDEV, V.I.

      80th anniversary of Academician Aleksandr Evgen'evich Fersman;
      1883-1945. Vest. LGU 19 no.12:176-177 '64   (MIRA 17:8)

LEBEDEV, V.I.; SVESHNIKOV, G.B.

American scientist at Leningrad University. Vest. LGU 19 no.12:
177-178 '64   (MIRA 17:8)

L 58339-65   EWT(m)/EWA(h)   Peb
ACCESSION NR: AT5010447   UR/3136/64/000/709/0001/0007

AUTHOR: Apalin, V. F.; Gritsyuk, Yu. N.; Kutikov, I. Ye.; Lebedev, V. I.; Mika-
elyan, L. A.

TITLE: Kinetic energy of fragments and energy balance in the fission of U-235 by
thermal neutrons

SOURCE: Moscow. Institut atomnoy energii. Doklady, no. 709, 1964. Kinetiches-
kaya energiya oskolkov i energeticheskiy balans pri delenii U^{235} teplovymi ney-
tronami, 1-7

TOPIC TAGS: uranium 235, thermal neutron fission, fragment kinetic energy, energy
balance, symmetrical fission, asymmetrical fission

ABSTRACT: The distribution of the total kinetic energy of the supplementary frag-
ments produced in the fission of U^{235} by thermal neutrons was determined with the
aid of a gas ionization chamber as a function of the ratio of the fragment masses.
The ionization chamber was described by the authors elsewhere (ZhETF v. 46, 1197,
1964; Nucl. Phys. v. 55, 249, 1964). The pulses from the ionization chamber were
fed to a multichannel ratio analyzer, 30 channels of which covered the investigated

Card 1/2

L 58339-65
ACCESSION NR: AT5010447   O

mass range. The data reduction and the error analysis are briefly discussed.
Plots are presented of the total kinetic energy of the U^{236} fragments against the
initial mass of the heavy fragment, of the spectra of the total kinetic energy of
the symmetrical-fission fragment kinetic energy, of the spectra of the total kinet-
ic energy of the fragment for several mass ratios, and of the energy balance in the
fission of U^{236}. A value of 21 MeV is obtained for the difference between the aver-
age kinetic energies in symmetical fission and in fission in which the heavy frag-
ment is magic (K_h = 130--132). The ratio of the maximum of the curve showing the
yield of the final fragments to its minimum in the case of symmetrical fission was
approximately 500:1 in these measurements. The total energy release, obtained from
the experimental data, is in good agreement with the value calculated by the semi-
empirical Weizsacker formula in all cases, except in the region of the strongly a-
symmetrical fission. Orig. art. has: 5 figures and 1 formula.

ASSOCIATION: none

SUBMITTED: 00   ENCL: 00   SUB CODE: NP

NR REF SOV: 002   OTHER: 008
Card 2/2

L 58340-65   EWT(m)/EPF(n)-2/EWA(h)   Pu-4
ACCESSION NR: AT5010448

AUTHOR: Apalin, V. F.; Gritsyuk, Yu. N.; Kutikov, I. Ye.; Lebedev, V. I.; Mika-
elyan, L. A.

UR/3136/64/000/710/0001/0009

TITLE: Emission of neutrons from the fission fragments of U-233, U-235, and Pu-239

SOURCE: Moscow. Institut atomnoy energii. Doklady, no. 710, 1964. Emissiya ney-
tronov iz oskolkov deleniya U^{233}, U^{235}, i Pu^{239}, 1-9

TOPIC TAGS: fission fragment, uranium fission, plutonium fission, neutron emission,
neutron energy

ABSTRACT: This is a sequel to earlier measurements of neutron emission from indi-
vidual fragments in the fission of U^{235} (ZhETF v. 46, 1197, 1964; Nucl. Phys. v. 55,
249, 1964). The present paper deals with the results of analogous measurements in
the case of the fission of U^{233} and Pu^{239}. The measurement procedure was described
in the earlier paper. Special attention is paid to the reliability with which sym-
metrical fission events are separated. It is shown that the number of false events
registered in the region of symmetrical fission has been reduced to 15--20%. The
plot of the number of neutrons against the initial mass of the fragment exhibits a
deep minimum whose position is very close to the region of closed shells H = 82,
Card 1/2

L 58340-65
ACCESSION NR: AT5010448

2

Z = 50 (M = 130--132). At this minimum the fragments emit only approximately 0.3 neutron. The curve also exhibits a maximum which has a different position for the different nuclei and shifts towards larger masses with increasing atomic weight of the fissioning nucleus. The position of the maximum for each of the nuclei is quite close to a mass value which is complementary to the magic fragment. An empirical formula is derived for the energies carried away by the neutrons from the fragments. Some hypotheses concerning the manner in which fission proceeds are advanced. "The authors thank J. Milton for supplying the tables compiled by him (UCRL 9883, 1962) and to B. Geylikman and V. Strutinskiy for interesting discussions." Orig. art. has: 6 figures and 3 formulas.

ASSOCIATION: none

SUB CODE: NP

ENCL: 00

SUBMITTED: 00

OTHER: 012

NR REF SOV: 006

Card 2/2

L 60937-65   EWT(m)/EWA(h)   Peb

ACCESSION NR: AP5014317   UR/0367/65/001/005/0816/0820

AUTHORS: Apalin, V.; Gritsyuk, Yu.; Kutikov, I.; Lebedev, V.;
Mikaelyan, L.

TITLE: Kinetic energy of fragments and energy balance in thermal
neutron fission of U-235

SOURCE: Yadernaya fizika, v. 1, no. 5, 1965, 816-820

TOPIC TAGS: uranium 235, thermal neutron fission, symmetrical fission,
fragmetn energy, fragment mass distribution, magic nucleus

ABSTRACT: The distribution of the total kinetic energy of complemen-
tary fission fragments was measured as a function of the fragment-mass
ratio, using a gas ionization chamber. The total kinetic energy of
the fragments from the fission of U^{235} by thermal neutrons was measur-
ed directly with the double-grid ionization chamber used by the authors
previously (ZhETF v. 46, 1197, 1964; YaF v. 1, 639, 1965). The
pulses from the ionization chamber were fed to a multichannel ratio
analyzer in which the range of ratios subtended 30 analyzer channels.

Card 1/3

L 60937-65

ACCESSION NR: AP5014317

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For each mass ratio the authors measured the distribution of events with respect to the total ionization produced by the fragments in the chamber. The analyzer energy scale was calibrated against time-of-flight kinetic-energy measurements at a mass value corresponding to the most probable fission. A value of 21 MeV was obtained for the difference between the average kinetic in symmetrical fission and in fission in which the heavy fragments are magic (130 -- 132). The experimental results were in good agreement with those of J. Milton and J. Fraser (Phys. Rev. Letters v. 7, 67, 1961; Can. Jour. Phys. 40, 1626, 1962), except in the symmetric-fission region, where the decrease in energy, compared with the value at the peak, amounts to 21 MeV. The ratio of the maximum and minimum of the final-fragment yield curve in symmetrical fission proved to be approximately 500:1. The total energy release found from the experimental data is in good agreement with calculations based on the semi empirical Weizsacker formula, except for the regions of strongly asymmetric fission. The causes of the discrepancies in the latter case are not clear. Orig. art. has: 5 figures

Card 2/3

L 60937-65

ACCESSION NR: AP5014317   ○

ASSOCIATION: None

SUBMITTED: 16Oct64   ENCL: 00   SUB CODE: NP

NR REF SOV: 002   OTHER: 008

Card   3/3

LEBEDEV, V.I.; MAKSUMOV, M.N.; MAROCHNIK, L.S.

Collective processes in gravitating systems. Part 1. Astron. zhur.
42 no.4:.9-717 Jl-Ag '65.   (MIRA 18:8)

1. Astrofizicheskiy institut AN TadzhSSR.

L 04615-67   EWT(1)/EWP(e)/EWT(m)/EEC(k)-2/T/EWP(k)   IJP(c)   WG/WH

ACC NR: AP6033158   SOURCE CODE: UR/0250/66/010/009/0644/0646

AUTHOR: Lebedev, V. I.; Pilipovich, V. A.

ORG: Institute of Physics, AN BSSR (Institut fiziki AN BSSR)

TITLE: Generation losses of a solid-state laser

SOURCE: AN BSSR. Doklady, v. 10, no. 9, 1966, 644-646

TOPIC TAGS: solid state laser, ruby laser, laser resonator, resonator loss , laser cavity, laser pumping, laser energy

ABSTRACT: Resonator losses during different stages of generation were measured experimentally in terms of variation in the beam divergence and spot diameter at the rod end of a ruby laser. The test laser consisted of a polished cylindrical ruby rod 120 mm long and 12 mm in diameter. The laser cavity was formed by two external dielectric mirrors (each 99% reflective) placed 46 cm apart. The rod was pumped by two IPKKh 130/14 straight pulsed xenon lamps placed inside a polished cylindrical Duralumin reflector 36 mm long. The lamp input was 2900 j and the pulse threshold energy 900 j. Changes in beam divergence and beam spot diameter were recorded on film by means of a high-speed camera. The beam divergence angle was measured using a method proposed by the authors elsewhere (ZhPS, 3, 342, 1965). Experimental data indicate that cavity losses increase with the pumping energy. The losses are nearly the same at the beginning and end of generation, which would seem to indicate their weak dependence on rod heating due to pumping. Optical deformation of the rod is

Card 1/2

L 04615-67

ACC NR: AP6033158

negligible. An increase in the loss coefficient and divergence angle of a ruby laser is attributed to rod inhomogeneities and to the nature of the mode excitation in the cavity. The effect is possibly enhanced by an increase in ruby inhomogeneity from the center to the lateral surfaces of the rod. A more detailed analysis of how inhomogeneity of an active medium affects laser losses will be published shortly. Orig. art. has: 1 formula and 1 figure.

SUB CODE: 20/ SUBM DATE: 18Feb66/ ORIG REF: 006/ OTH REF: 006/ ATD PRESS: 5100

Card   2/2

ACC NR: AT6034341 ·   SOURCE CODE: UR/0000/66/000/000/0154/0176

AUTHOR: Lebedev, V. I. (Moscow)

ORG: none

TITLE: On the KR method of accelerating the convergence of iterations in solving a kinetic equation

SOURCE: Chislennyye metody resheniya zadach matematicheskoy fiziki (Numerical methods of solving problems in mathematical physics); sbornik statey. Moscow, Izd-vo Nauka, 1966, 154-176

TOPIC TAGS: iteration, Boltzmann equation, kinetic equation, integrodifferential equation, Euclidean space, linear operator, operator equation, linear differential equation, second order differential equation, boundary value problem

ABSTRACT: A new method for the acceleration of iterations is proposed. The work is based on earlier work of V. I. Lebedev (KR-metod iteratsiy dlya kineticheskogo uravneniya, Materialy Soveshchaniya po matem. metodam resheniya zadach yadernoy fiz., Dubna, 17--20 noyabrya 1964, Dubna, VTs OIYaI, 1965, 93--96). The principle of the construction and numerical realization of operators $M(A)$ and $M_1(A)$ in the KR method consists of the fact that two different K and R operations are in one iteration step. Operation K is simple: $x^{(nk + 1)/n} = Ax^k + f$, where $n \geq 1$ is some integer and x^k is

UDC: 517.9:533.9

Card 1/2

ACC NR: AT6034341

the approximate value of x obtained in the k-th iteration step. For a given k, a family of linear operators B_i, C_i, γ_i and

$$T_i = (B_i - C_i)^{-1}((B_i - C_i(E - \tau_i))T_{i-1} - C_i\tau_i),$$

$$S_i = (B_i - C_i)^{-1}(B_i - C_i(E - \tau_i)),$$

where i = 1, 2, ..., n - 1; T_0 = A; and γ_i are operators that play the role of iteration parameters, is constructed. This paper examines the case of n = 2 and γ_1 = E as applied to boundary value problems for a kinetic equation, and $w^{k+\frac{1}{2}}$ is found as the solution of the so-called R-equations in a coordinate space. Operation R consists of formulating a boundary value problem in domain D for a second-order differential equation

$$Q_n w = P_n (hw + \bar{f_i}).$$

Differential operators are constructed for the R operation. A periodic problem is formulated, and KR method is applied to it. Selection of the parameters of the R operation and the bound $\| \psi \|$ are discussed. Algorithms are given for the KR method. Numerous calculations of complicated problems in cylindrical geometry have shown the high effectiveness of the KR method. The author thanks Ye. S. Kuznetsov, G. I. Marchuk, and A. N. Tikhonov for valuable discussion. Orig. art. has: 67 formulas and 3 tables.

SUB CODE: 12/ SUBM DATE: 13Nov64/ ORIG REF: 017/ OTH REF: 001

Card 2/2

L 10970-67   FSS-2/EWT(1)   DD/GD
ACC NR: AT6036587   SOURCE CODE: UR/0000/66/000/000/0214/0215

33

AUTHOR: Kolosov, I. A.; Chekirda, I. F.; Lebedev, V. I.; Khlebnikov, G. F.;
Kas'yan, I. I.

ORG: none

TITLE: Rotation tests as a method of detecting covert forms of motion sickness
under conditions of weightlessness [Paper presented at the Conference on Problems
of Space Medicine held in Moscow from 24 to 27 May 1966]

SOURCE: Konferentsiya po problemam kosmicheskoy meditsiny, 1966. Problemy
kosmicheskoy meditsiny. (Problems of space medicine); materialy konferentsii,
Moscow, 1966, 214-215

TOPIC TAGS: weightlessness, biologic acceleration effect, coriolis acceleration,
motion sickness, diagnostic medicine, vestibular analyzer

ABSTRACT: Some Soviet cosmonauts (G. S. Titov, V. V. Nikolayeva-Tereshkova,
K. P. Feoktistov, B. B. Yegorov) with adequately high vestibular analyzer
resistance to motion sickness experienced vestibulo-autonomic discomfort
under conditions of prolonged weightlessness. In this connection, the prob-
lem of exposing people suffering from vestibular disorders assumes the
greatest significance. An attempt to identify latent forms of motion sick-
ness more completely was undertaken.

Card 1/4

L 10970-67

ACC NR: AT6036587   O

The methodological approach consisted of a modified Barani rotational test (10 rotations for 10 sec) during horizontal flight in a jet aircraft and during conditions of weightlessness (25 sec). During the first stage, the rotational test was conducted during the five sec after the beginning of stabilized weightlessness. In the second stage, the same people were rotated at the beginning of the transition period from 2 G to 0 G for 5 sec and then for an additional 5 sec during the beginning of weightlessness.

Examinations were conducted on male subjects aged 23—45 with high vestibular resistance to motion sickness under terrestrial conditions and high tolerance of weightlessness during flights.

Three basic components of the vestibular analyzer were studied:
    1. somatic (duration of postnystagmus)
    2. autonomic (pulse rate, perspiration, skin color)
    3. sensory (subjective illusions, illusions of counterrotation).

It was revealed that 18. 2% of the subjects had latent forms of motion sickness during rotational tests under conditions of stabilized weightlessness. In this group, the duration of counterrotational illusion was prolonged, as was postrotational nystagmus by 2—5 sec compared to horizontal flight

Card 2/4

ACC NR: AT0073597

C

data, paleness or redness of facial skin was apparent, and moderate hyper-hydrosis was noted as were illusions of changed body position with the eyes closed. Increased salivation and worsened subjective feelings were also noted.

Vestibulo-autonomic discomfort was not observed in the remainder of subjects. The duration of counterrotational illusion and postrotational nystagmus was shortened by 4—6 sec in the majority of subjects, while in others these indices were not shortened.

At the beginning of rotation in the period of transition from positive G to weightlessness during the second stage, tolerance of angular accelerations during stabilized weightlessness revealed 22. 2% more cases of latent motion sickness. In these subjects, the duration of counterrotational illusions increased as compared to their duration during stabilized weightlessness; pronounced paleness of facial skin, lip cyanosis, pronounced, general hyperhydrosis, nausea, hypersalivation, and discomfort in the area of the stomach were observed. The termination of nystagmus could not be fixed relative to the onset of accelerations following weightlessness.

In the opinion of the authors, symptoms of motion sickness during ro-

Card 3/4

L 10970-67

ACC NR: AT6036587

tational tests under conditions of stabilized weightlessness were found for the following reasons: first, under conditions of weightlessness the function of the otolithic component of the vestibular apparatus was modified due to the unusual position of the otoliths (floating state) which led to increased sensitivity to angular accelerations during rotation of the chair; second, manifestations of Coriolis accelerations as a result of Barani chair rotation during parabolic flight.

In those cases when the rotational test was completed in the period of transition from acceleration to weightlessness, additional adequate irritation of the otoliths associated with a sharp switch from a "plus" stimulus to a "minus" took place, facilitating the more rapid accumulation of Coriolis accelerations.

Therefore, the use of a modified rotational test under short-term weightlessness conditions reveals latent forms of motion sickness even in people with high resistance and can be used for prognostic purposes.

Use of the rotational test in the period of transition from acceleration to weightlessness reveals latent forms of motion sickness most effectively. [W.A. No. 22; ATD Report 66-116]

SUB CODE: 06 / SUBM DATE: 00May66

Card 4/4

L 8905-65   EWG(j)/EWG(r)/EWT(1)/FS(v)-3/EWG(v)/EWG(a)/EWG(c)   Pe-5/Pb-4/Pa-4
AFTC(b)/RAEM(t)/AFETR/AMD DD/RD
ACCESSION NR: AP4046056   S/0245/64/000/005/0003/0010

AUTHOR: Khlebnikov, G. F. (Moscow); Lebedev, V. I. (Moscow)   B

TITLE: Dynamics of emotional and volitional processes in cosmonauts during parachute jumps

SOURCE: Voprosy* psikhologii, no. 5, 1964, 3-10

TOPIC TAGS: cosmonaut training, parachute jump, simulated space-flight, emotion, defensive reflex, fear, sympathetic tonus, parasympathetic tonus, physiological stress, psychological stress

ABSTRACT: Obervations of cosmonauts during jump training included pulse rate and dynamometry of hand grips, which shed light on modifications to the initial emotional stress reactions which occurred as training progressed. In the first days of jumping, the pulse rate on enplaning and just before the jump increased to as much as 120 to 140 beats/min. Simultaneously, other signs of an asthenic fear reaction (passive-defensive reflex) were observed. Grip strength (from a hand dynamometer) increased significantly in almost all cases in the first days of jumping. The registered increase in these indices just before

Card 1/2

L 8905-65
ACCESSION NR: AP4046056

jumping fell off gradually as training progressed, finally almost re-
turning to initial levels. The second stage of training (more com-
plicated jumps, e. g., at night, over water, in flight gear) was
marked by a moderate redistribution of autonomic reactions due to
gain in sympathetic nervous tonus. This state, which is identical to
that normal to trained parachutists just before complex jumps, is
characterized by the disappearance of oculocardiac reflexes, a notice-
able increase in pulse rate during orthostatic tests, and a change in
the galvanic skin response. Parachute jumping increases the excita-
bility of the autonomic nervous system, reinforcing sympathetic tonus
before the jump and parasympathetic tonus afterwards. By strengthen-
ing the volitional processes and, thereby, the conscious control of
behavior, jump training improved the emotional reaction to danger in
cosmonauts. Orig. art. has: 2 tables.

ASSOCIATION: none

SUBMITTED: 00   ENCL: 00

SUB CODE: PH, LS   NO REF SOV: 014   OTHER: 003

Card 2/2

VOLYNKIN, Yu.M.; ARUTYUNOV, G.A.; ANTIPOV, V.V.; ALTUKHOV, G.V.;
BAYEVSKIY, R.M.; BELAY, V.Ye.; BUYANOV, P.V.; BRYANOV, I.I.;
VASIL'YEV, P.V.; VOLOVICH, V.G.; GAGARIN, Yu.A.; GENIN, A.M.;
GORBOV, F.D.; GORSHKOV, A.I.; GUROVSKIY, N.N.; YESHANOV, N.Kh.;
YEGOROV, A.D.; KARPOV, Ye.A.; KOVALEV, V.V.; KOLOSOV. T.A.;
KORESHKOV, A.A.; KAS'YAN, I.I.; KOTOVSKAYA, A.R.; KALIBERDIN,
G.V.; KOPANEV, V.I.; KUZ'MINOV, A.P.; KAKURIN, L.I ; KUDROVA,
R.V.; LEBEDEV, V.I.; LEBEDEV, A.A.; LOBZIN, P.P.; MAKSIMOV,
D.G.; MYASNIKOV, V.I.; MALYSHKIN, Ye.G.; NEUMYVAKIN, I.P.;
ONISHCHENKO, V.F.; POPOV, I.G.; PORUCHIKOV, Ye.P.; SIL'VESTROV,
M.M.; SERYAPIN, A.D.; SAKSONOV, P.P.; TERENT'YEV, V.G.; USHAKOV,
A.S.; UDALOV, Yu.F.; FOMIN, V.S.; FOMIN, A.G.; KHLEBNIKOV, G.F.;
YUGANOV, Ye.M.; YAZDOVSKIY, V.I.; KRICHAGIN, V.I.; AKULINICHEV,
I.T.; SAVINICH, F.K.; STMPURA, S.F.; VOSKRESENSKIY, O.G.;
GAZENKO, O.G., SISAKYAN, N.M., akademik, red.

[Second group space flight and some results of the Soviet
astronauts' flights on "Vostok" ships; scientific results of
medical and biological research conducted during the second
group space flight] Vtoroi gruppovoi kosmicheskii polet i neko-
torye itogi poletov sovetskikh kosmonavtov na korabliakh
"Vostok"; nauchnye rezul'taty medikobiologicheskikh issledovanii,
provedennykh vo vremia vtorogo gruppovogo kosmicheskogo poleta.
Moskva, Nauka, 1965. 277 p.   (MIRA 18:6)

L 42134-65   EEO-2/EWG(j)/FSS-2/EWG(r)/EWT(1)/FS(v)-3/EEC(k)-2/EWG(v)/EWA(d)/
EWG(a)-2/EWG(c)   Po-4/Pe-5/Pq-4/Pac-4/Pi-4/Pae-2   TT/DD/RD/GW
ACCESSION NR: AP5007273   S/0216/65/000/002/0169/0181

AUTHOR: Kas'yan I. I.; Kolosov, I. A.; Lebedev, V. I.; Yurov, B. N.

TITLE: Reactions of cosmonauts during parabolic flights in air-
planes

SOURCE: AN SSSR. Izvestiya. Seriya biologicheskaya, no. 2, 1965,
169-181

TOPIC TAGS: parabolic flight, physiological reaction, weightlessness,
acceleration, cardiovascular reaction, respiratory reaction, post-
rotational nystagmus, counterrotation illusion, cosmonaut

ABSTRACT: Physiological reactions of Soviet cosmonauts under con-
ditions of alternate acceleration and weightlessness on parabolic
flights were studied and compared. Weightlessness lasted up to 40—
45 sec on the first series of flights made in a two-seater aircraft,
and 20—30 sec on subsequent flights in aircraft with a "swimming-pool"
apparatus, where the cosmonauts could move freely in space. During
the flights, weightlessness was preceded by acceleration of 2.5—3.5 g.
Functional changes in the cardiovascular and respiratory systems were
charted. Some cosmonauts showed unstable and reversible changes of

Card 1/4

L 42134-65
ACCESSION NR: AP5007273

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these indices during acceleration. The respiratory rate of Gagarin, Titov, Nikolayev, Bykovskiy, and Popovich (14—26 cycles per min on earth) increased by 4—13 cycles per min under 3-g acceleration. During acceleration before and after weightlessness the pulse of most of the cosmonauts showed an increase of 12—35 beats per min over that registered during horizontal flight. Systolic pressure increased 5-15 mm Hg under acceleration, while diastolic pressure varied little (117-155/60-82 mm Hg on earth). Cardiovascular and respiratory activity had usually returned to normal by the end of the period of weightlessness (2.5—15 min after the last "peak" of the flight); the rate of normalization varied with the individual. Autonomic reactions are not altered by a short period of weightlessness (as determined by Voyachek's otolithic test). Finger-to-nose tests with the eyes closed were performed successfully by cosmonauts during and after flight. The illusion of counterrotation and postrotational nystagmus were moderately pronounced after the first flight, and decreased after each subsequent flight. The illusion of counterrotation decreased by 1—3 sec on the average. Reduction of postrotational nystagmus was sharper (1-7 sec).   For)example, V. V. Tereshkova had an illusion of counterrotation before the first flight of 12 sec, before the third of 6 sec, and before the fourth of 5 sec. Corres-
Card 2/4

L 42134-65

ACCESSION NR: AP5007273

ponding data for six other cosmonauts are given. Spatial orientation in conditions of weightlessness was possible when cosmonauts could visually check the aircraft's position. But with the eyes closed, all suffered illusory sensations of their position in the chamber and that of the aircraft in space. Coordination of movements was tested during flight on a "coordinograph" (measuring time of total operation, number of errors, time of single operation, etc.), and by a writing test. For most cosmonauts the coordinograph showed some delay in the rate of execution of motor acts but no signs of disruption of coordination. Cosmonauts tried to perform a given task under conditions of weightlessness with the same muscular force as on earth. On the first flight, they all used 250—1250 grams more force than required, except for V. F. Bykovskiy, who used only 50 grams too much. These excesses diminished gradually with subsequent flights, until by the second to the fifth flight, the cosmonauts maintained the required force sufficiently stably. Maximum muscular strength (measured on a hand dynamometer) was considerably lowered in conditions of weight-lessness, as compared with horizontal flight (6—12 kg for the right hand, 4—12 kg for the left). Individual differences in sensory,

Cord 3/4

L 42134-65
ACCESSION NR: AP5007273

motor, and autonomic reactions noted in these tests prove the value
of such research in the cosmonaut selection program. Orig. art.
has: 6 figures and 5 tables.

ASSOCIATION: none   [JS]

SUBMITTED: 05Jan65

NO REF SOV: 022   ENCL: 00   SUB CODE:PH,LS

                             OTHER: 011   ATD PRESS: 3237

Card 4/4

L 50344-65   EEC-2/EWG(j)/FSS-2/EWG(r)/EWT(1)/FS(v)-3/EEC(k)-2/EWG(v)/EWA(d)/
EWG(a)-2/EWG(c)   Po-4/Pe-5/Pq-4/Pac-4/Pae-2/Pi-4   GW/TT/DD
ACCESSION NR: AP5013308   UR/0216/65/000/003/0329/0334

AUTHOR: Yeremin, A. V.; Kas'yan, I. I.; Kolosov, I. A.; Kopanev,
V. I.; Lebedev, V. I.

TITLE: The working capacity of man under conditions of weightlessness

SOURCE: AN SSSR. Izvestiya. Seriya biologicheskaya, no. 3, 1965,
329-334

TOPIC TAGS: manned space flight, Vostok 1, weightlessness, biologi-
cal effect, work capacity, manned orbiting laboratory

ABSTRACT: The Vostok-1 flight showed that the working capacity of
cosmonauts was sufficiently preserved in spite of extremely full
schedules.   On Vostok-1, K. P. Feoktistov, observed stars and the
aurora polaris above the visual horizon, observed the horizon, noted
the stability of gas bubbles in liquid and the behavior of water in
a gas medium, logged observations, photographed the surface of the
earth and the heavens, conducted vestibular and psychological probes,
and ate regularly. At the same time, B. B. Yegorov carried on radio-
telephone communications and medical observations on himself and other

Card 1/4

L 50344-65

ACCESSION NR: AP5013308

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crew members. Basically he made determinations of pulse rates, mus-
cular working ability during rhythmic finger movements, visual acuity
by special charts, light sensitivity and illumination brightness by
an adaptometer, ocular muscle tonus by a special prism, vestibular
analyzer excitability by d-c current, and blood tests. It is likely
that as the number of cosmonaut missions during space flight is
increased, working ability will be somewhat decreased, especially
in unfettered situations. This must be taken into consideration
when planning future, more prolonged, space expeditions in which the
crews will have fairly complex and full schedules. In overcoming
the unfavorable effects of weightlessness on the working capacity
of the crews, the following two approaches are suggested: the
first approach entails increasing functional capabilities through
adaptation to altered gravity; the second entails the technological
perfection of spacecraft and their instrumentation. In connection
with the first approach, the selection and training of cosmonauts
plays a major role. Particular attention should be given to training
cosmonauts to maintain their working capacities even when disruptions
of analyzer functions participating in spatial orientation take
place. However, it should be remembered that the functional capability

Card 2 / 4